

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 09/289,600

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (previously presented): A monochromatic image display system

comprising:

a display device comprising a plurality of picture elements, each picture element comprising a series of spatially adjacent cells, each cell emitting light in a same color and expressing tones in three or more levels; and

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a cell signal generating means which generates, based on a monochromatic image signal indicating an output luminance of each picture element of a monochromatic image, a cell signal for each spatially adjacent cell of a respective picture element of said display device, said cell signal determining an output tone level of the cell, so that an average of the output luminances of all the cells within each respective picture element correspond to an output luminance of the respective picture element,

wherein each respective picture element of said display device corresponds to a picture element of said monochromatic image, and

wherein the output luminances of the plurality of picture elements of said display device express said monochromatic image.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 09/289,600

2. (previously presented): A monochromatic image display system as defined in Claim 1 in which the cell signal generating means generates cell signals so that the output luminances of the cells of the respective picture element of said display device are substantially uniform.

3. (previously presented): A monochromatic image display system as defined in Claim 1 in which the cell signal generating means generates cell signals so that the output luminances of the cells of the respective picture element of the display device change at an inclination according to a tone gradient vector of picture elements around the respective picture element corresponding to the cells.

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4. (previously presented): A monochromatic image display system as defined in Claim 1 in which the cell signal generating means intensity-modulates input signal levels to the respective cells independently of each other.

5. (previously presented): A monochromatic image display system as defined in Claim 1 in which the cell signal generating means time-modulates input signal levels to the respective cells independently of each other.

6. (previously presented): A monochromatic image display system as defined in Claim 5 in which the cell signal generating means time-modulates input signal levels to the respective cells by frame.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 09/289,600

7. (original): A monochromatic image display system as defined in Claim 6 in which the cell signal generating means determines the output tone level of each cell so that the output luminances of frames are substantially uniform.

8. (original): A monochromatic image display system as defined in Claim 6 in which the maximum number of tones which can be expressed by each cell per one frame is not smaller than 64 (6 bits).

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9. (previously presented): A monochromatic image display system as defined in Claim 1 further comprising a tone number conversion means which carries out a tone number conversion processing on an input original monochromatic image signal, thereby generating said monochromatic image signal, wherein a number of tones represented by said monochromatic image signal is no greater than a number of tones which can be expressed by each respective picture element of said display device.

10. (original): A monochromatic image display system as defined in Claim 9 in which the number of tones represented by the original monochromatic image signal is not smaller than 256 (8 bits).

11. (original): A monochromatic image display system as defined in Claim 1 in which the display device expresses each picture element by three cells.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 09/289,600

12. (original): A monochromatic image display system as defined in Claim 1 in which the display device is a liquid crystal panel.

13. (previously presented) A monochromatic image display system comprising:

a display device comprising a plurality of picture elements, each picture element comprising a series of spatially adjacent cells, each cell emitting light in a same color and expressing tones in three or more levels, and at least two of said series of cells having maximum output levels different from each other; and

EI CMX
a drive means which drives the cells of a respective picture element so that the output level difference per one level of said three or more levels differs from each other between said at least two of said series of cells,

wherein the plurality of picture elements express a monochromatic image.

14. (original): A monochromatic image display system as defined in Claim 13 in which the maximum output level of one of said at least two cells is substantially the same as the output level difference per one level of the other cell.

15. (original): A monochromatic image display system as defined in Claim 14 in which the drive means drives the cells so that said at least two cells express tones in substantially the same number of levels.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 09/289,600

16. (original): A monochromatic image display system as defined in Claim 13 in which the display device is a liquid crystal panel provided with monochromatic filters which are different in transmittance and respectively formed on said at least two cells for each picture element so that the maximum output levels of said at least two cells become different from each other.

17. (previously presented): A monochromatic image display system as defined in Claim 13 in which the display device is an organic EL panel in which said at least two cells for each picture element emit light in the same color at different luminances for a given signal level,

wherein said given signal level indicates an output luminance of the respective picture element having said at least two cells.

18. (previously presented): A monochromatic image display system as defined in claim 1, wherein said display device is further characterized as being a flat panel-like display device, and is further characterized in that the display device is a monochromatic display device which makes a display in said same color which falls within the region surrounded by points $(0.174, 0)$, $(0.4, 0.4)$ and $(\alpha, 0.4)$ as represented by co-ordinates (x, y) on a CIE chromaticity diagram,

wherein α represents the x-coordinate of the intersection of a spectrum locus and a straight line $y=0.4$.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 09/289,600

19. (previously presented): A monochromatic image display system as defined in Claim 18 in which the display device further comprises at least one of elements including a substrate, a face plate, a diffuser panel, a color filter, a diffuser film, a collimator film, a prism film and a polarizing film which are colored to a predetermined color.

20. (previously presented): A monochromatic image display system as defined in Claim 18, further comprising at least one of:

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an area modulation means which controls the output luminance of each picture element by selectively turning on and off input signals to respective cells, for each picture element, independently of each other,

a time modulation means which drives the respective cells for each picture element in a time division system, and

an intensity modulation means which controls input signal levels to the respective cells for each picture element independently of each other,

wherein the cells are driven so that the maximum luminance of each picture element is in the range of $100\text{cd}/\text{m}^2$ to $10000\text{cd}/\text{m}^2$.

21. (previously presented): A monochromatic image display system as defined in Claim 20 in which the maximum luminance of each picture element is in the range of $500\text{cd}/\text{m}^2$ to $5000\text{cd}/\text{m}^2$.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 09/289,600

22. (previously presented): A monochromatic image display system as defined in Claim 18 in which the display device is a liquid crystal panel.

23. (previously presented): A monochromatic image display system as defined in Claim 18 in which the display device is an organic EL panel.

24. (previously presented): A monochromatic image display system as defined in Claim 4, wherein:

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there are M cells in each picture element;

there are L tones expressible by intensity modulation of each cell, excluding a zero tone level;

the zero tone level is expressed when the input signals into each of the cells of a respective picture element are turned off; and

each picture element has a range of $M \times L + 1$ tones, including the zero tone level.

25. (previously presented): A monochromatic image display system as defined in Claim 5, wherein:

there are M cells in each picture element;

there are N tones expressible by time modulation of each cell, excluding a zero tone level;

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 09/289,600

the zero tone level is expressed when the input signals into each of the cells of a respective picture element are turned off; and
each picture element has a range of $M \times N + 1$ tones, including the zero tone level.

26. (previously presented): A monochromatic image display system as defined in Claim 1 in which the cell signal generating means intensity-modulates and time-modulates the input signal levels to the respective cells independently of each other.

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27. (previously presented): A monochromatic image display system as defined in Claim 26, wherein:

there are M cells in each picture element;
there are L tones expressible by intensity modulation of each cell, excluding a zero tone level;

there are N tones expressible by time modulation of each cell, excluding the zero tone level;

the zero tone level is expressed when the input signals into each of the cells of a respective picture element are turned off; and

each picture element has a range of $M \times L \times N + 1$ tones, including the zero tone level.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 09/289,600

28. (previously presented): A monochromatic image display system as defined in Claim 1, wherein:

at least two of said series of cells have maximum output levels different from each other;
and

said cell signal generating means generates the cell signal for each cell so that the output level difference per one level differs from each other between said at least two of said series of cells.

29. (previously presented): A monochromatic image display system as defined in Claim 1, wherein said display device is a monochromatic display device which makes a display in said same color which falls within a region surrounded by points (0.174, 0), (0.4, 0.4) and (α , 0.4) as represented by co-ordinates (x, y) on a CIE chromaticity diagram, wherein α represents an x-coordinate of an intersection of a spectrum locus with a straight line y=0.4.

30. (canceled).

31. (previously presented): A monochromatic image display system as defined in Claim 19, wherein said at least one of elements is formed of polyethylene terephthalate colored with an anthraquinone dye to a color of said predetermined color.

32-34. (canceled).

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 09/289,600

35. (previously presented): A monochromatic image display system as defined in Claim 18, wherein said same color is blue.

36. (previously presented): A monochromatic image display system as defined in Claim 29, wherein said same color is blue.

37. (previously presented): A monochromatic image display system as defined in Claim 9, wherein a number of tones represented by said input original monochromatic image signal is greater than said number of tones represented by said monochromatic image signal.

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38. (new): A monochromatic image display system comprising:
a display device comprising a plurality of picture elements, each picture element comprising a series of spatially adjacent cells, each cell emitting light in a same color and expressing tones in three or more levels; and
a cell signal generating means which generates, based on a monochromatic image signal indicating an output luminance of each picture element of a monochromatic image, a cell signal for each spatially adjacent cell of a respective picture element of said display device, said cell signal determining an output tone level of the cell, so that a sum of the output luminances of all the cells within each respective picture element correspond to an output luminance of the respective picture element,
wherein each respective picture element of said display device corresponds to a picture element of said monochromatic image, and

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 09/289,600

wherein the output luminances of the plurality of picture elements of said display device
express said monochromatic image.
